

6.0 PIPELINE ACCESS

The pipeline will enter the disposal site directly from the ICWW located to the east. It may cross through a patchy mangrove margin that borders the ICWW on Site MSA 640.

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FIND.17[WP]MSA610-7.2
02/08/91

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Engineering Narrative

MSA 640/640A Disposal Area

This narrative summarizes the documents comprising the dredge and fill permit application package for the development of the MSA 640/640A dredged material containment area. Site MSA 640/640A will be a permanent facility to service the maintenance requirements of Reach IV of the Intracoastal Waterway (ICWW) in Palm Beach County, Florida from the S.R. 812 bridge in Lantana, to the southern county line (ICWW mile 291.72 to mile 310.22).

The submission of this application package represents an intermediate step towards completion of the second phase of a two phased program element addressing the maintenance requirements of the Intracoastal Waterway in Palm Beach County, Florida. This element is part of a fifteen year program sponsored by the Florida Inland Navigation District to develop a long-term dredged material management plan for the Intracoastal Waterway along the entire east coast of Florida. Phase I of the Palm Beach County program element, which is documented in two reports included as Attachments 1, and 2 to this permit application, developed basic plan concepts for the continuing management of maintenance material dredged from the Intracoastal Waterway in Palm Beach County, defined short and long term program needs based on a comprehensive examination of historical dredging records for the project area, and identified suitable centralized sites which satisfy these needs based on preliminary environmental, engineering, and operational criteria. Phase II consists of the gathering of detailed, site specific information required for the preparation and submission of permit applications for the eight primary containment sites identified in Phase I. In addition, Phase II also addresses the preliminary design of the site containment facilities; the acquisition of these sites (where appropriate), through negotiated purchase or condemnation, by the Florida Inland Navigation District; and the construction and continuing operation and maintenance of these sites as permanent dredged material management facilities.

No attempt is made in this narrative to recount, in detail, the information contained in the documents which accompany the permit application. Rather, this narrative is designed to assist the reviewer in organizing this information, while emphasizing the engineering considerations and design specifications presented in the attached permit drawings (Attachment 3). In addition to the permit drawings and the Phase I reports already mentioned, the permit application package for Site MSA 640/640A includes: Attachment 4, a topographic survey, documenting pre-construction topography and drainage patterns, and providing information necessary for site design, volumetric calculations, and grade analysis; Attachment 5, the sub-surface and soils report, identifying site foundation conditions and in-situ construction material suitability,

as well as locating the water table on-site; Attachment 6, the environmental report, documenting existing environmental conditions, including vegetation communities and wildlife habitats, and serving to guide the configuration of the containment area within the site so as to avoid, to the greatest extent possible, the most sensitive environmental areas; and Attachment 7, a site specific management plan, insuring that the containment area will continue to be operated in an efficient manner without undue conflicts with adjacent off-site land use, and allowing the site to be maintained as a permanent facility.

Site MSA 640/640A comprises two contiguous parcels, MSA 640 and MSA 640A, owned by the Florida Inland Navigation District with a total area of 7.09 acres. The site is located near the city of Boynton Beach, on the western shore of the ICWW (Attachment 3, Sheet 1 of 3). It is bounded on the north and south by residential developments, and on the west by a parcel of undeveloped land. Soils on the site consist predominantly of an Arents-Urban complex, which is a poorly drained sandy fill overlying organic soil. No historical or archaeological sites are recorded for this property, based on a review of the Florida Master Site File.

Vegetation in the northern portion of the site consists mainly of Brazilian pepper (422) and Australian pine (437) communities. A variety of residential landscaping species have been planted in the disturbed southern portion of the site including St. Augustine grass, cabbage palms and Washington palms. Other species occurring in this area are frog fruit, crowgrass, and hairy spurge. The northeast corner of the site, which extends into the ICWW, is submerged, however no other wetlands are present on site. Detailed environmental information for Site MSA 640/640A is provided in the attached environmental report (Attachment 6).

The preliminary site design layout includes a buffer area surrounding the containment area, separating it from adjacent properties (Attachment 3, Sheet 2 of 3). The buffer on the north, south, and west sides of the site will be approximately 50 ft wide, while the eastern buffer will vary in width from 25 to 60 ft. A portion of this buffer will consist of undisturbed vegetation occurring along the site perimeter.

The proposed containment area is defined by earthen dikes to be constructed of material excavated from the site interior. The existing mean elevation of the projected containment area was determined from topographic survey (Attachment 4) to be +6.07 feet NGVD. Specific soil and foundation information (soils/sub-surface report, Attachment 7) confirm the utility of the preliminary facility design as being well within the range of standard COE practice for similar sites and materials. Design dike specifications include

an initial dike crest height of 6.0 ft above grade (+12.07 ft NGVD), a side slope of 1V:3H, and a crest width of 12.0 ft, yielding a dike width at grade of 48 ft. As measured at the crest centerline, the dike perimeter is 1,812 ft, requiring 10,822 c.y. of material to construct. The containment basin will provide a capacity of 18,382 c.y., which is approximately 12 per cent of the projected 50 yr disposal requirement (158,000 c.y.) for Reach IV. The remainder of the reach requirement will be met by the utilization of three additional dredged material management sites located elsewhere in the reach.

An additional feature of the containment structure is a ramp to allow ingress and egress of heavy equipment to and from the interior of the diked area. Ramp details are shown in the permit application drawings (Attachment 3, Sheets 2 and 3 of 3). The outside of the ramp and the supporting toe maintain the same 1V:3H slope as the main dike. The ascending/descending grade is 5 per cent. These ramps will facilitate the regrading of material deposited in the containment basin to promote complete dewatering and ensure proper stormwater collection and drainage. In addition, the ramps will provide an efficient means of removing the material for use as detailed in the site-specific management plan (Attachment 9), as prevailing restrictions and market conditions dictate.

The total volume of material initially required for the ramp construction is 603 c.y. which, when added to the initial dike requirement of 10,822 c.y., yields a total construction material requirement of 11,425 c.y. This is to be provided by the uniform excavation of the containment area interior to an average depth of +2.55 ft NGVD (3.20 ft below grade), maintaining the 1V:3H dike slope and a 20 foot excavation setback from the interior toe of the dike. Allowing for 2 ft of freeboard, and an additional 2 ft of ponding depth at the completion of final dredging operations (i.e., filling the containment area to 4 ft below the dike crest, or 5.20 ft above the excavated interior grade elevation) yields an initial site disposal capacity of 18,382 cy. Also to be noted is the existence of the on-site water table located at a mean elevation of +1.81 ft NGVD, or 0.74 ft below the mean excavation grade, at the time of the sub-surface survey. Therefore, a sump and/or pumping of groundwater seepage may be required during construction, due to the close proximity of the water table to the finished interior grade.

Inlet pipeline access to the site from the Waterway will be located approximately 30 ft south of the northern site boundary (Attachment 3, Sheet 2 of 3). The inlet pipeline will be routed along the northern side of the containment dike, entering the basin near its northwest corner by passing over the dike crest (Attachment 3, Sheet 2 of 3).

Decanting of the ponded water will be accomplished by a parallel arrangement of three (3) corrugated metal half-pipes, located in the southeast corner of the containment area, diagonally opposite the slurry inlet (Attachment 3 Sheet 2 of 3). Each half-pipe will provide for the release of effluent over a sharp-crested weir section of minimum length of 8 ft, for a total minimum crest length of 24 ft. The weir crest height will be adjustable by means of removable flash boards from the excavated basin interior grade to 6.9 ft above the interior grade. The minimum weir crest elevation facilitates the control of stormwater runoff prior to disposal operations, while the maximum elevation facilitates control of the final elevation of the deposition layer surface. The three weirs are to be connected by a manifold, with a single outlet pipe passing under the dike and extending approximately 60 ft to the ICWW.

The specification of a minimum weir crest length of 24 ft is based on U.S. Army Corps of Engineers guidelines related to the dredge equipment. For this and all project calculations, it has been assumed that an 18 inch O.D. dredge, (discharge velocity of 16 ft/sec, a volumetric discharge of 3,560 c.y./hr, and a 20/80 solids/liquid slurry mix) would be used for future channel maintenance. Analysis of weir performance based on nomograms developed at the COE Waterways Experiment Station (WES) under the Dredged Material Research Program (DMRP) (Walski and Schroeder, 1978) indicates that these design parameters may be expected to produce an effluent suspended solids concentration of 0.45 g/l, assuming a minimum average ponding depth of 2 ft. Translation of suspended solids concentration to a measure of turbidity on which Florida water quality standards are based is highly dependent on the suspended material characteristics. However, WES guidelines (Palermo, 1978) indicate that the estimated effluent suspended solids concentration of 0.45 g/l correlates to an acceptable level of turbidity. Should effluent quality deteriorate below the ambient conditions of the receiving waters, steps shall be taken to decrease effluent turbidity. These may include intermittent dredge operation, increased ponding depth, or the use of turbidity curtains surrounding the site outlet weirs.

Road access to the site will be provided via a separate road easement, connecting the site to Federal Highway (U.S. 1), which lies approximately 600 ft west of the western site boundary (Attachment 3, Sheet 2 of 3). The access road connection will enter the site near the southwest property corner.

A system of perimeter ditches will be constructed at a 20 ft setback from the outside toe of the containment dike to control stormwater runoff from the exterior face of the containment dike, perimeter road, and portions of the buffer area. These ditches will also provide a means for intercepting any

horizontal migration of saltwater from the interior of the containment area. Preliminary analysis indicates that at a minimum depth of 2.8 ft, the ditches will provide adequate conveyance for the 25 yr storm runoff.

Finally, as part of this application an analysis of containment area efficiency was performed. No data are available to characterize the channel sediments in Reach IV of the ICWW in Palm Beach County. Therefore, the analysis was based on a conservative estimate that the sediment to be encountered within this reach includes up to 25 per cent silt, that is, up to 25 per cent of the material would pass a #200 sieve. This estimate is supported by the experience of the Jacksonville District Corps of Engineers. From the estimated silt content of the sediment to be dredged, a characteristic zone settling velocity was determined from an empirical relationship between silt content and settling behavior. This relationship was developed from Corps of Engineers sediment data characterizing the silt content of a variety of ICWW channel sediments and the corresponding settling behavior of slurry concentrations similar to those typically encountered in dredging operations (Attachment 7). The resulting zone settling velocity for the sediment to be placed in Site MSA 640/640A was determined to be 0.5 cm/min. This settling velocity was then used to determine the retention time needed to provide adequate sedimentation within the containment basin.

Analysis of the hydraulic characteristics of the proposed containment basin indicates that a 2 ft ponding depth provides a maximum retention time of 3.03 hours during the period in which flow over the weir balances the liquid discharge of the dredge. In comparison, the time required for the suspended sediment to settle out of the withdrawal layer of 2 ft is 2.03 hours, based on the zone settling velocity derived above. Research by the U.S. Army Waterways Experiment Station (WES) under the Dredged Material Research Program (DMRP) (Shields et al., 1987) indicates that to account for field conditions, the required settling time should be multiplied by a safety factor of 2.25. This corrected settling time of 4.57 hrs exceeds the calculated maximum retention time of 3.03 hours produced by the minimum ponding depth of 2 ft. Therefore, it is recommended that a minimum operational ponding depth of 4 ft be maintained whenever possible. This would result in a basin retention time of 6.06 hours which is sufficient to maintain the required effluent quality. Moreover, DMRP research indicates that under field conditions the depth of withdrawal may be significantly less than that predicted by the WES Selective Withdrawal Model referenced above. Therefore, providing the recommended operational ponding depth of 4 ft should eliminate the possibility of resuspension, as well as doubling the retention time over that provided by a 2 ponding depth. This should ensure that the turbidity of the effluent released from Site MSA 640/640A meets state water quality standards. In order to achieve the maximum capacity of the containment basin, it will be necessary to reduce the ponding depth to less than the recommended depth of 4 ft during the final stages of disposal.

operations. At this time, additional measures may be required to maintain adequate water quality. These include installing turbidity screens or floating baffles around the weirs, or requiring the dredge plant to shut down until the surface water quality reaches acceptable limits.

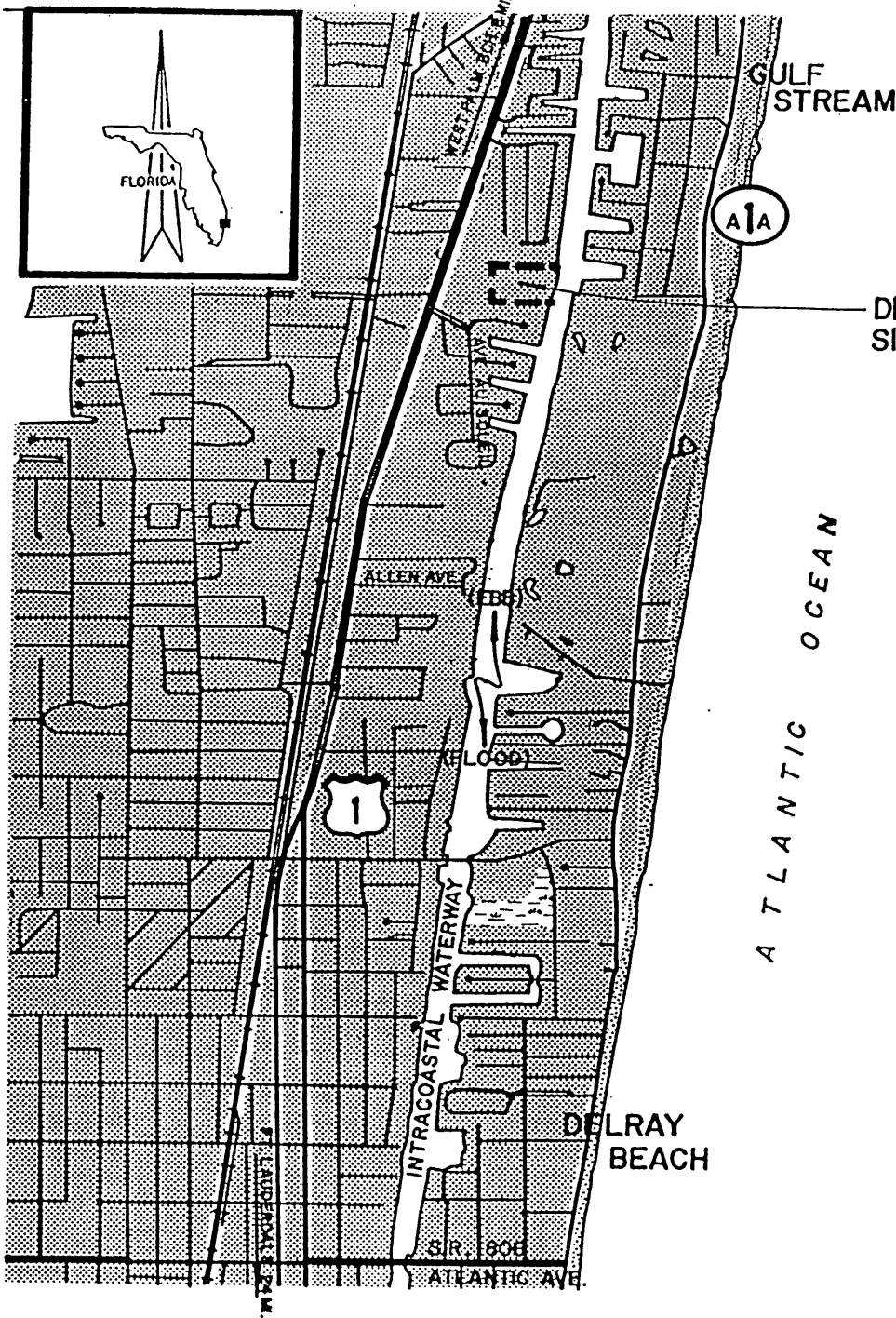
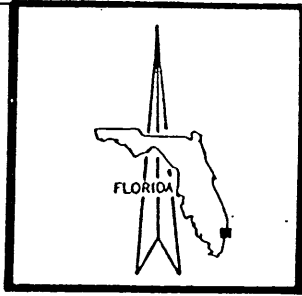
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26°30'00"

80°02'30"

26°30'00"



DISPOSAL
SITE MSA 640/640A

A T L A N T I C
O C E A N

DELRAY
BEACH

S.R. 806
ATLANTIC AVE.

REFERENCED

USGS DELRAY BEACH, FL.
QUADRANGLE 1962, PHOTO-
REVISED 1969 AND 1973.

80°02'30"



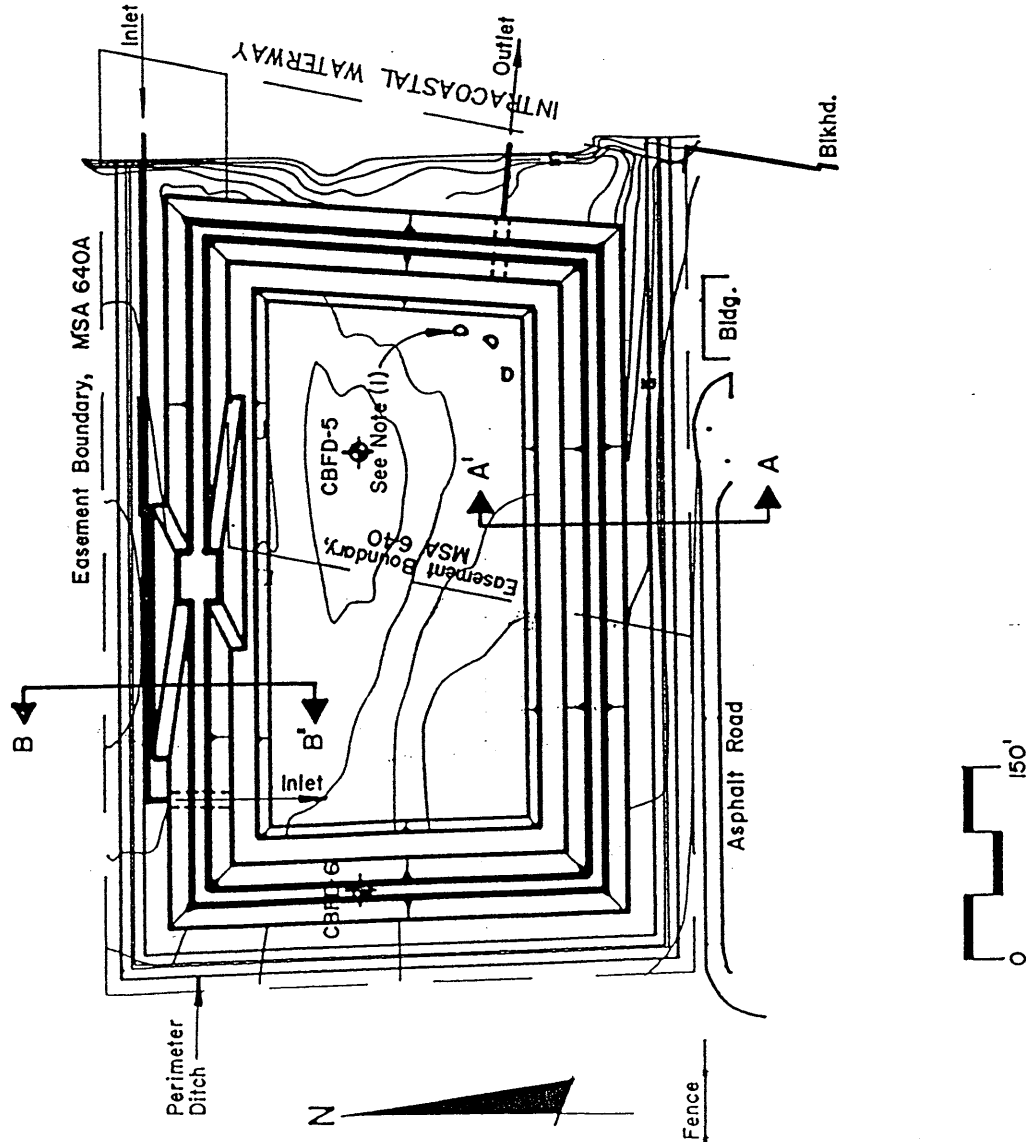
TAYLOR ENGINEERING INC
9086 CYPRESS GREEN DRIVE
JACKSONVILLE, FLORIDA 32256

Location of FIND MSA 640/640A
Dredged Material Disposal Site
Palm Beach County, Florida

PROJECT	C-9005
REVISION	
SHEET	1 of 3
DATE	Mar., 1992

Notes:

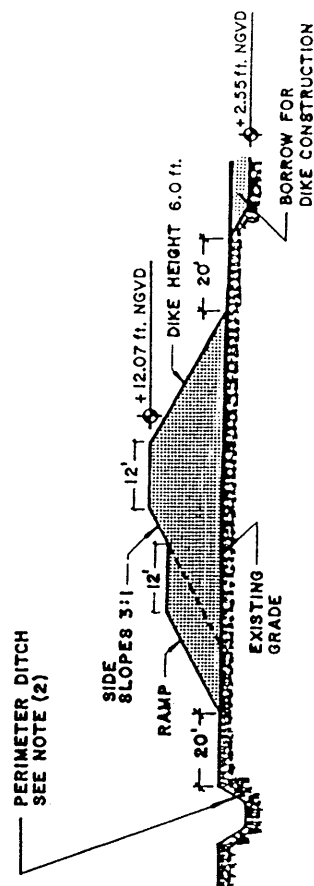
1. Weirs: Three 8 ft. dia. CM Half-Pipes With Removable Flash Boards Adj. From +3.64ft. Above Grade to Below Grade (With Connecting Manifold.)
2. Containment Area:
Within Outside Toe of Dike: 4.46 Acres
Within Inside Toe of Dike: 2.67 Acres
Capacity: 18,382 Cubic Yards
Sections A-A', B-B' See Sheet 3 of 4.
3. Elevation Datum: NGVD of 1929
4. Area Outside Dike Within Site Boundary to be a Buffer of Natural Vegetation.
5. Perimeter Ditch. See Sheet 3 of 4.
6. Indicates Core Boring Locations.



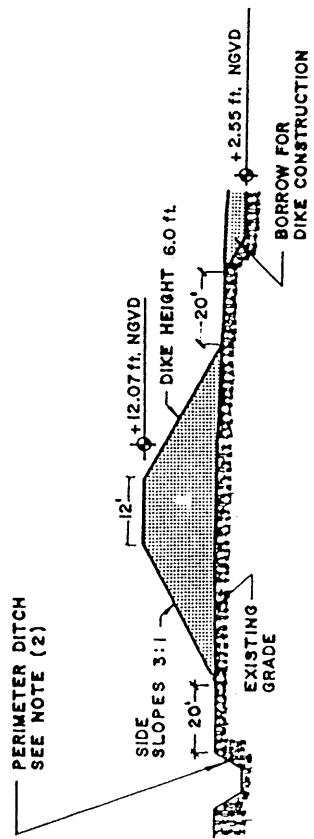
TAYLOR ENGINEERING INC
9086 CYPRESS GREEN DRIVE
JACKSONVILLE, FLORIDA 32256

Disposal Area Site Plan
Site MSA 640/640A
Palm Beach County, Florida

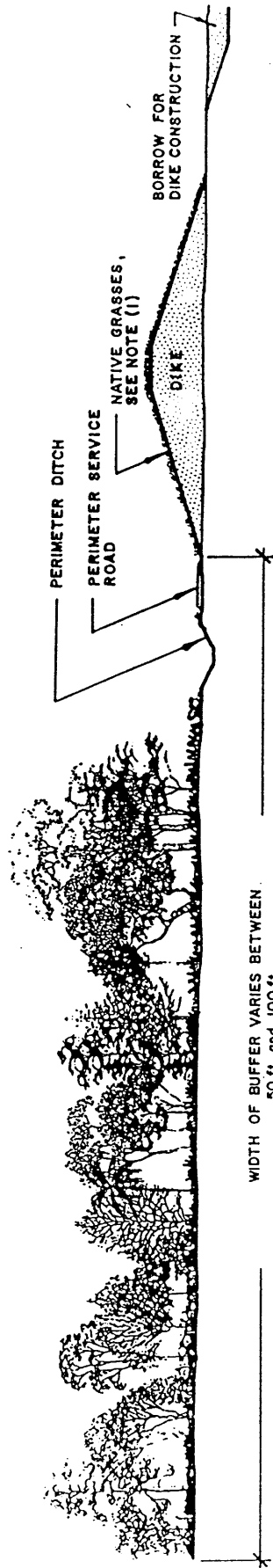
PROJECT	C-9005
REVISION	
SHEET	2 of 3
DATE	Mar., 1992




SECTION A-A'
N.T.S.



SECTION B-B'
N.T.S.



- NOTES:
1. TYPICAL SPECIES INCLUDE:
PASPALUM VAGINATUM
SPARTINA PATENS
SPOROBOLUS SPECIES
 2. PERIMETER DITCH:
SIDE SLOPE: 1:1
BOTTOM WIDTH: 3 ft.
MIN. DEPTH BELOW GRADE: 3.2 ft.
BOTTOM SLOPE AS REQUIRED FOR DRAINAGE

 <p>TAYLOR ENGINEERING INC 9086 CYPRESS GREEN DRIVE JACKSONVILLE, FLORIDA 32256</p>	<p>Typical Dike and Ramp Sections, Vegetation Plan Site MSA 640/640A Palm Beach County, Florida</p>
PROJECT	C-9005
REVISION	
SHEET	3 of 3
DATE	Mar., 1992

ENVIRONMENTAL SITE DOCUMENTATION
FOR
PROPOSED DREDGED MATERIAL DISPOSAL AREAS
IN PALM BEACH COUNTY

VOLUME V - MSA 641A

Report Prepared Under Contract to:

TAYLOR ENGINEERING, INC., FOR THE
FLORIDA INLAND NAVIGATION DISTRICT

Prepared by:
E. Lynn Mosura

WATER AND AIR RESEARCH, INC.
Gainesville, Florida

February 1991
File: 75301

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1.0 INTRODUCTION

A 50-year dredged material management plan is being developed for the Intracoastal Waterway (ICWW) along Palm Beach County, Florida. The plan concept was developed during Phase I of the project (Bromwell and Carrier 1989). Potential sites were screened for dredged material disposal, and a total of eight primary sites were selected after consideration of environmental, engineering, and operational factors.

During the current Phase II effort, primary sites will undergo further environmental scrutiny to assure the selection of sites with minimal environmental constraints. This document reports the results of the environmental survey carried out at one of these sites.

Site MSA 641A is located approximately 1.5 miles north of State Road 806 (Atlantic Ave.) and east of U.S. 1 along the western side of Lake Worth Creek (ICWW) near Delray Beach (Figure 1-1). The 11.5-acre site is adjacent to a drive-in theater/flea market and other commercial property that fronts U.S. Highway 1. Property to the north and south of the site is single family residential.

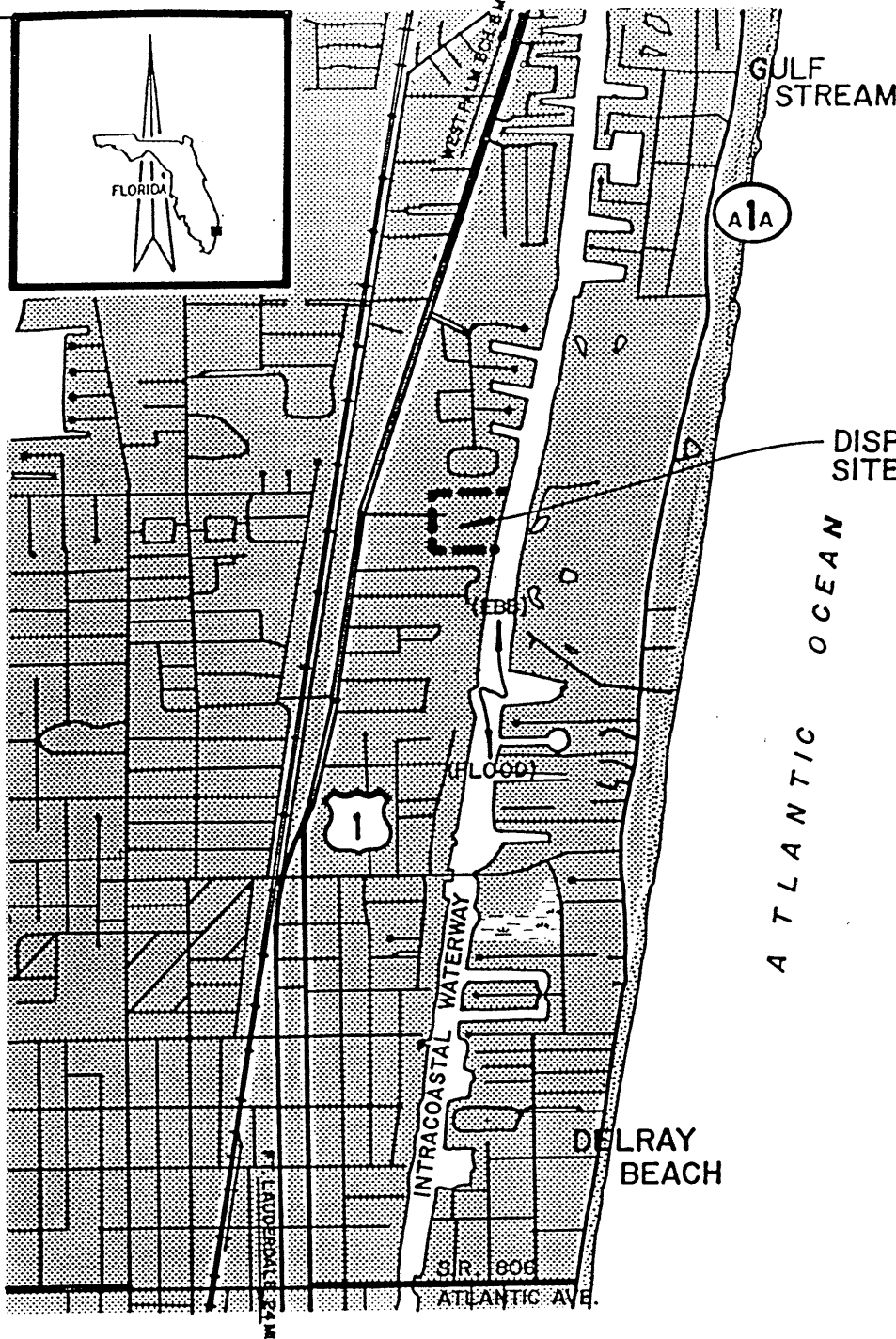
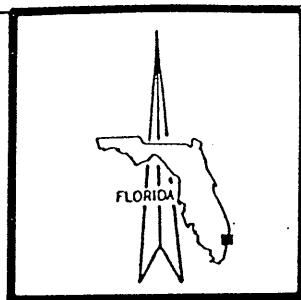
The soils on the site are mostly Arents-Urban land complex. This soil type is a somewhat poorly drained sandy fill that was placed over organic soils in low, wet areas bordering the ICWW. There is a small area on the western side of the site that contains St. Lucie-Urban land complex soil. These are excessively drained soils that have been modified by earth moving for urban land uses. Elevations on the site range from below +5 feet National Geodetic Vertical Datum (NGVD) along the ICWW to nearly +10 feet NGVD on the western side of the site.

A review of the Florida Master File indicates no known historical or archaeological sites on this property.

26°30'00"

80°02'30"

26°30'00"



DISPOSAL SITE (MSA 641A)

ATLANTIC OCEAN

DELRAY BEACH

ATLANTIC AVE.

REFERENCED

USGS DELRAY BEACH, FL.
QUADRANGLE 1962, PHOTO-
REVISED 1969 AND 1973.



TAYLOR ENGINEERING INC
9086 CYPRESS GREEN DRIVE
JACKSONVILLE, FLORIDA 32256

FIGURE I-1 Location MSA 641A
Proposed Dredged Material
Disposal Site, Palm Beach
County, Florida

PROJECT
REVISION
SHEET
DATE

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The proposed pipeline route enters Site MSA 641A directly from the ICWW channel located east of the site.

2.0 METHODOLOGY

A Water and Air Research, Inc., biologist ground-truthed the site on September 5, 1990, to assess vegetation and wildlife conditions. During this visit, incidental wildlife sightings were recorded and vegetative conditions were noted.

Blue-line aerial photography (1986 and 1989) at a scale of 1"=200' was used to identify pertinent land use and vegetation features prior to the pedestrian survey. During the field survey, all noted photographic signatures were visited and plant species at these locations were identified or collected for subsequent examination. Vegetation mapping was done on 1989 blue-line aerials (1"=200'). The frequency of occurrence of each plant species within each identified community was determined using a qualitative ranking system. Designations include abundant, locally abundant, common, locally common, occasional and rare. Using the blue-line aerial photography mentioned above as well as 1984 color infrared aerial photography (1"=2,000'), the site was reviewed for the presence and location of possible wetlands. The County Soil Survey and U.S. Geological Survey (USGS) topographic maps were also consulted to locate possible wetlands on site.

The occurrence of wildlife species on site was documented during visits to each vegetation community. Efforts were made to visit locations of high wildlife habitat value. Areas that were likely to yield animal signs were sought out (i.e., muddy roads/wetland edges). Indirect evidence (nests, scat, and tracks) and direct observation (calls and visual sightings) were utilized to confirm species present. All ecological surveys were conducted during daylight hours, hence nocturnal wildlife observations were not made.

Prior to the field survey, lists of endangered and threatened species and species of special concern possibly occurring on site were compiled based on the range of the species and their environmental requirements. The locations of sensitive species found on site were recorded and observations about population size and habitat use were noted.

3.0 VEGETATION COMMUNITIES

3.1 INTRODUCTION

Vegetation communities and land uses identified at Site MSA 641A and mapped in Figure 3-1 include Brazilian pepper (422), Australian pine (437), streams and waterways (510), mangrove swamp (612), and disturbed land (740). The vegetation and land uses have been categorized to Level III of the Florida Land Use, Cover and Forms Classification System (FDOT 1985). Acreages of the various map units were determined with a digitizer and are reported in Table 3-1. Table 3-2 is a list of the vegetation species by community type found at the site.

The site has been used as a dredged material disposal site in the past. The disturbed nature of the vegetation and prevalence of exotic species reflects this history.

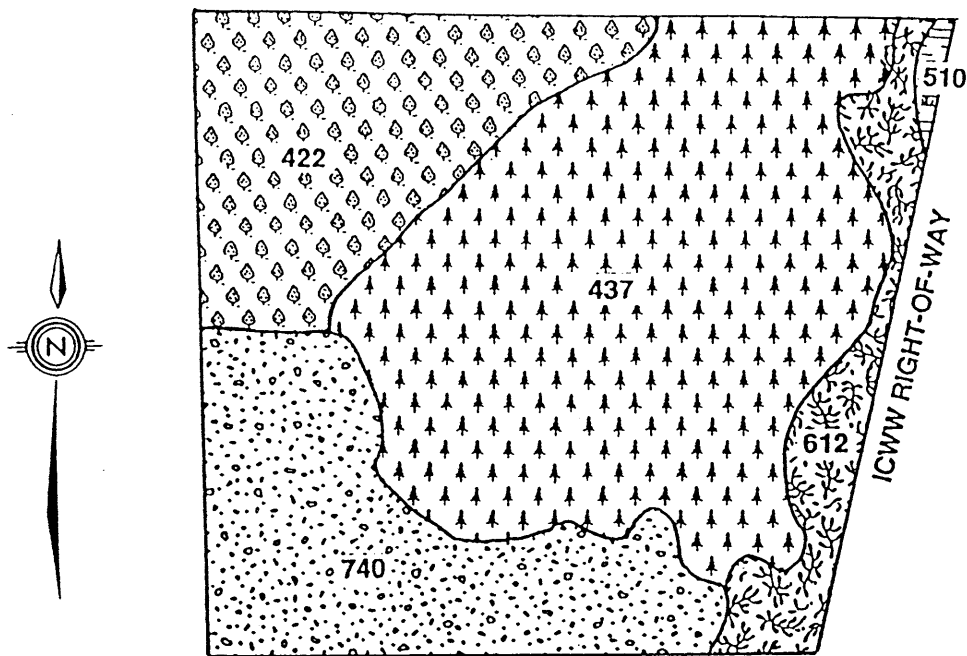
3.2 BRAZILIAN PEPPER (422)

The northwestern portion of the site is vegetated by predominantly Brazilian pepper and other exotic plant cover. Ground cover is sparse in some areas because of the dense Brazilian pepper cover. In other areas Brazilian pepper is uncommon and ground cover is dominated by escaped exotic plants, St. Augustine grass or weedy herbaceous plants. Rather than map this area under a separate cover type, it was included in the Brazilian pepper community. Common or locally common ground cover species include beggar's ticks, poorman's patch, bowstring hemp, Mexican tea and several varieties of philodendron.

3.3 AUSTRALIAN PINE (437)

Most of the site is covered with the exotic hardwood, Australian pine. Other tree and shrub species found within this community include Brazilian pepper, strangler fig, sea grape and cabbage palm.

Ground cover is dominated by a variety of rapidly invading exotic plant species including Boston fern, philodendron, mother of thousands and Madagascar periwinkle. Other common ground cover species include Virginia



LEGEND

	422	BRAZILIAN PEPPER
	437	AUSTRALIAN PINE
	510	STREAMS AND WATERWAYS
	612	MANGROVE SWAMP
	740	DISTURBED LAND



FIGURE 3-1. Land Use and Vegetation of MSA 641A Proposed Dredged Material Disposal Site, Palm Beach County, Florida

Table 3-1. Approximate Acreage of the Florida Land Use, Cover and Forms Classification System Found at the MSA 641A Proposed Dredged Material Disposal Site, Palm Beach County, Florida

Map I.D. No.	Name	Approximate Acreage
422	Brazilian Pepper	2.1
437	Australian Pine	5.9
510	Streams and Waterways	0.1
612	Mangrove Swamp	0.8
740	Disturbed Land	2.6
TOTAL		11.5

Source: WAR 1990.

Table 3-2. Vegetation Species by Community Type Found at the MSA 641A
Proposed Dredged Material Disposal Site, Palm Beach County,
Florida (Page 1 of 3)

Species	Common Name	Occurrence
BRAZILIAN PEPPER (422)		
Trees and Shrubs		
<u>Coccoloba uvifera</u>	Sea grape	O
<u>Cycas circinalis</u>	Queen sago	R
<u>Schinus terebinthifolius</u>	Brazilian pepper	A
Herbs and Ground Covers		
<u>Bidens pilosa</u>	Beggar's ticks	LC
<u>Cenchrus</u> sp.	Sandspur	R
<u>Chenopodium ambrosioides</u>	Mexican tea	C
<u>Cissus trifoliata</u>	Marine vine	A
<u>Melothria pendula</u>	Creeping cucumber	C
<u>Mentzelia floridana</u>	Poorman's patch	C
<u>Philodendron</u> spp.	Philodendron	A-O
<u>Phlebodium aureum</u>	Golden polypoidy	R
<u>Phytolacca americana</u>	Pokeberry	O
<u>Sansevieria thyrsiflora</u>	Bowstring hemp	LC
<u>Stenotaphrum secundatum</u>	St. Augustine grass	LC
<u>Thelypteris hispidula</u>	Hairy maiden fern	R
<u>Tillandsia</u> sp.		X
AUSTRALIAN PINE (437)		
Trees and Shrubs		
<u>Brassaia actinophylla</u>	Schefflera	R
<u>Cairica papaya</u>	Papaya	R
<u>Casuarina equisetifolia</u>	Australian pine	A
<u>Coccoloba uvifera</u>	Sea grape	R
<u>Eugenia uniflora</u>	Surinam cherry	R
<u>Ficus aurea</u>	Strangler fig	R
<u>Octoea coriacea</u>	Lance wood	X-R
<u>Sabal palmetto</u>	Cabbage palm	O
<u>Schinus terebinthifolius</u>	Brazilian pepper	C
<u>Serenoa repens</u>	Saw palmetto	R

Table 3-2. Vegetation Species by Community Type Found at the MSA 641A
Proposed Dredged Material Disposal Site, Palm Beach County,
Florida (Page 2 of 3)

Species	Common Name	Occurrence
Herbs and Ground Covers		
<u>Catharanthus roscus</u>	Madagascar periwinkle	O
<u>Kalanchoe</u> sp.	Mother of thousands	LA
<u>Nephrolepis</u> sp.	Boston fern	LC
<u>Parthenocissus quinquefolia</u>	Virginia creeper	C
<u>Philodendron</u> spp.	Philodendron	LC
<u>Phlebodium aureum</u>	Golden polypoidy	
<u>Poinsettia cyathophora</u>	Painted-leaf	O
<u>Rivina humilis</u>	Rouge-plant	O
MANGROVE SWAMP (612)		
Trees and Shrubs		
<u>Conocarpus erecta</u>	Buttonwood	A
<u>Cycas circinalis</u>	Queen sago	X
<u>Randia aculeata</u>	White indigoberry	R-O
<u>Sabal palmetto</u>	Cabbage palm	X-R
<u>Sambucus canadensis</u>	Southern elderberry	R-O
<u>Schinus terebinthifolius</u>	Brazilian pepper	O-C
<u>Thespesia populnea</u>	Seaside mahoe	O-C
DISTURBED LAND (740)		
Tree and Shrubs		
<u>Brassaia actinophylla</u>	Schefflera	R-O
<u>Casuarina equisetifolia</u>	Australian pine	R
<u>Ficus aurea</u>	Strangler fig	O
<u>Pinus elliottii</u>	Slash pine	R
<u>Sabal palmetto</u>	Cabbage palm	X-R
<u>Schinus terebinthifolius</u>	Brazilian pepper	R

Table 3-2. Vegetation Species by Community Type Found at the MSA 641A
Proposed Dredged Material Disposal Site, Palm Beach County,
Florida (Page 3 of 3)

Species	Common Name	Occurrence
Herbs and Ground Covers		
<u>Ambrosia artimisiifolia</u>	Common ragweed	O-C
<u>Bidens pilosa</u>	Beggar's ticks	O
<u>Catharanthus roseus</u>	Madagascar periwinkle	R-O
<u>Cenchrus</u> sp.	Sandspur	R-O
<u>Chamaesyce hirta</u>	Hairy spurge	C
<u>Dactyloctenium aegyptium</u>	Crowfoot grass	A
<u>Desmodium</u> sp.		R
<u>Digitaria villosa</u>	Shaggy crab-grass	O
<u>Heterotheca subaxillaris</u>	Camphorweed	O
<u>Mentzelia floridana</u>	Poorman's patch	LC
<u>Opuntia</u> sp.	Prickly pear	O-LC
<u>Parthenocissus quinquefolia</u>	Virginia creeper	O
<u>Setaria macrosperma</u>	Coral foxtail	O

Occurrence code: A = Abundant; LA = Locally Abundant; C = Common; LC = Locally
Common; O = Occasional; R = Rare; X = Trace.

Source: WAR 1990.

creeper, and an unidentified sterile dicot. Few native shrubs are present but some saw palmetto was observed as well as some young cabbage palm. Brazilian pepper was common beneath the Australian pine canopy.

3.4 STREAMS AND WATERWAYS (510)

A small area of the ICWW occurs within the MSA 641A site. This area is unvegetated open water.

3.5 MANGROVE SWAMP (612)

The mangrove swamp is located along the eastern part of the site, bordering the ICWW. Within the Australian pine forest near the ICWW is an old dredged material containment dike that delineates the mangrove area from the upland forested area. Along this interface is a steep drop-off of 8 feet or more. The mangrove community is dominated by buttonwood. Occasionally seaside mahoe and Brazilian pepper were prevalent, especially along the upland border. Other species observed include elderberry and cabbage palm.

3.6 DISTURBED LAND (740)

Along the southwestern portion of Site MSA 641A is an area that was cleared before July 1986. Aerial photographs taken at that time show a newly cleared portion of the site with little vegetation cover. A portion of the site along the southern boundary of the property was also cleared by this date, but these same aerial photographs show significant plant cover. This indicates that the disturbance along this portion of the site is not as recent as that in the southwest corner of the parcel.

Existing trees in the southwest portion of this community consist of a few remaining slash pine. Many pine snags are still standing in this area, indicating a more widespread slash pine cover in the recent past. Ground cover vegetation consists of grasses and low-growing herbs that tolerate regular mowing. Common species observed include crowfoot grass, shaggy crab grass and hairy spurge. Some weedy plant species were observed in this area and along the margins of this community including camphorweed, ragweed, and beggar's ticks.

Along the southern boundary in the older disturbed land community, vegetation is similar to the disturbed vegetation in the southwest corner but has not been mowed regularly. Other species observed in this area but not in the newer disturbed land area include prickly pear cactus, Virginia creeper, Madagascar periwinkle, schefflera and poorman's patch.

3.7 ENDANGERED AND THREATENED PLANTS

The endangered and threatened plants that may occur at Site MSA 641A are listed in Table 3-3. Only two state listed plants were found on the MSA 641A site. Golden polyploidy fern was observed within the Australian pine community and the Brazilian pepper community. It was observed growing epiphytically on cabbage palms as well as on the ground. Hairy maiden fern was growing in a disturbed portion of the Brazilian pepper community among some escaped ornamental plants.

The level of disturbance on this site reduces the likelihood of the occurrence of listed plants. Although the two ferns observed on the site are listed as threatened by the state, these two species are really quite common. Most ferns identified as threatened by the Florida Department of Agriculture are listed as such to discourage collecting.

Table 3-3. Status of State or Federally Listed Endangered' and Threatened Plants That May Occur at MSA 641A Proposed Dredged Material Disposal Site, Palm Beach County, Florida

Species	Status		
	State	FCREPA	Federal
<u>Cereus robinii</u> Tree cactus	E	E	E, II
<u>Cereus undatus</u> Night-blooming cereus	T		II
<u>Phlebodium aureum*</u> Golden polyploidy	T		
<u>Thelypteris hispidula*</u> Hairy maiden fern	T		
<u>Thrinax microcarpa</u> Brittle thatch palm	CE		
<u>Tillandsia fasciculata</u> Common wild pine	CE		
<u>Tillandsia flexuosa</u> Twisted wild-pine	T		
<u>Tillandsia simulata</u> Wild pine	T	T	

*confirmed on site

State: Florida Department of Agriculture; E = Endangered; T = Threatened;
CE = Commercially exploited.

FCREPA: Florida Committee on Rare and Endangered Plants and Animals
(Unofficial); E = Endangered; T = Threatened.

Federal: United States Fish and Wildlife Service; E = Endangered.

Convention on International Trade in Endangered Species of Wild
Fauna and Flora; II = Appendix II species.

Source: FGFWFC 1990.
NeSmith 1990.
WAR 1990.

4.0 WILDLIFE COMMUNITIES

Table 4-1 lists species of wildlife observed during field surveys and identifies habitats in which they were observed. Wildlife habitats on site include all of the communities listed in Table 3-1.

4.1 WILDLIFE HABITAT

The wildlife value of this site moderately poor. Site MSA 641A is small, bordered on three sides by residential and commercial areas. It is covered by non-native plants that provide few food resources for wildlife. However, its thick vegetation provides good cover for wildlife and the proximity to the ICWW and fringing mangrove wetlands tends to offset some of the poor wildlife habitat characteristics of the site.

The site provides some habitat for reptiles and amphibians. The Cuban treefrog, squirrel treefrog and southern toad are likely to be found in low numbers on the site. Ground skinks may be found in the Australian pine litter.

Mammals that may utilize the upland habitats include raccoon, armadillo and opossum. Both introduced and native, mice and rats may also be found in these areas. Birds common in suburban areas were observed in the tree canopy. These include starling, mockingbird, bluejay, common crow, and rock dove. A variety of other birds such as northern cardinal, red-bellied woodpecker, and common grackle may occur on the site. Some migrants such as warblers will use Australian pine canopies, but not to the same extent as native woodlands. An oriole, possibly a spot breasted, was observed feeding in a strangler fig tree. Because most of the tree canopy consists of Australian pine, food resources for birds are seriously limited.

The shoreline drops off on the other side of an old containment dike into ICWW. This area provides some limited fringing emergent wetlands. The buttonwood dominated shoreline does provide some foraging habitat for wading birds. Burrows of the great land crab were observed along the sandy, steeply

Table 4-1. Vertebrates and Invertebrates Observed at the MSA 641A Proposed Dredged Material Disposal Site, Palm Beach County, Florida

Scientific Name	Common Name	Vegetation Community*
BIRDS		
<u>Caprimulgidae</u>	Unidentified goatsucker	437
<u>Colaptes auratus</u>	Northern flicker	740
<u>Columba livia</u>	Rockdove	740
<u>Corvus brachyrhynchos</u>	Common crow	740
<u>Cyanocitta cristata</u>	Bluejay	437
<u>Icterus pectoralis</u>	Spot-breasted oriole	740
<u>Mimus polyglottos</u>	Northern mockingbird	740
<u>Pelecanus occidentalis</u>	Brown pelican	612
<u>Sturnus vulgaris</u>	European starling	740
<u>Zenaida macroura</u>	Mourning dove	740,437
MAMMALS		
<u>Sciurus carolinensis</u>	Eastern grey squirrel	740
INVERTEBRATES		
<u>Gecarcinus</u> sp.	Unidentified land crab	612

*437 = Australian pine; 612 = Mangrove swamp; 740 = Disturbed land.

Source: WAR 1990.